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Major Constraints of Village Poultry Production in Demba Gofa District of Southern Region, Ethiopia

Aman Mulugeta, Mersha Chanie and Basaznew Bogale

Department of Veterinary Paraclinical Studies, Faculty of Veterinary Medicine,
University of Gondar, P. O. Box, 196, Gondar, Ethiopia

Abstract: A cross sectional study was conducted from September 2011 to March 2012 to identify and estimate the prevalence of ectoparasites of poultry managed under backyard system in Demba Gofa district of Gamo Gofa zone. A total of 384 chickens of different age groups and both sexes were examined. Overall, 322/384 (83.85%) of chickens were infested with one or more species of ectoparasites that mainly grouped into flea 269 (83.5%), lice 109 (33.85%) and fowl tick 16(4.97%). Seven species of ectoparasites were identified. Among them, *Echinophaga gallinacean* (stick tight flea) 269/384 (83.5%) was the most prevalent ectoparasites species followed by lice species *Menopon gallinea* 49/109 (44.95%), *Menacanthus stramineus* 22/109 (20.18%), *Lipeurus caponis* 17/109 (15.6%), *Goniocotes gigas* 14/109 (12.84%) and *Goniocotes gallinea* 7/109 (6.42%) while the least identified was fowl tick / Argas persicus / 16/ (4.97%). Mixed infestation 64/322 (19.87%) and single infestation 258/322 (80.12%) of ectoparasites was also recorded. The difference in prevalence rate of ectoparasites in brooder (44.41%) was higher than the adult (13.66%). The finding in age group showed that there was a statistically significant in prevalence of ectoparasites between brooder and adult chicken ($p<0.05$).The difference in prevalence rate of ectoparasites in female (64.90%) higher than that of the male (35.09%). There was a statistically significant difference ($p < 0.05$) in infestation rate of ectoparasites between two sexes. Generally, the study indicated that the external parasites are highly prevalent in backyard chickens in the study area which is associated with lack of due attention with respect to hygienic system, treatment and control practices. Therefore, control of ectoparasites based on creation of awareness to the community about the overall effect of ectoparasites on productivity of poultry and others are recommended.

Key words: Backyard · Demba Gofa · Ectoparasites · Poultry · Prevalence

INTRODUCTION

Poultry has influenced man civilization in many ways. Eggs and meat of birds are being consumed since prehistoric time. Compared to eggs there is no other single food of animal origin which is eaten relished by so many people in the world and none is served in such a variety ways. Its popularity is justified not only because it's so easy procured and has so many uses in cooking but also because it is almost unsurpassed product in nutritive excellence. Poultry meat is also used extensively as a delicious food [1].

Rural poultry production is an integral part of a balanced farming system and has a unique position in the rural house hold economy supplying high quality protein to the family. In addition to their contribution to high value of protein, it is a source of easily disposable income for farm households. Rural poultry integrate very well in a sustainable way into other farming activities. Because they require little labor and initial investment compare to other farm activities [2]. It is also reported that rural poultry play a significant role through their contribution to the cultural and social life of rural people [3].

In Ethiopia, rural poultry production represents a significant portion of the rural economy, as a source of income for small holder farmers [4]. The total poultry population of Ethiopia is estimated at 39.6 million [5]. The majority (99%) of these chickens are maintained under traditional system with little or no inputs for housing, feeding or health care. Rural chicken in Ethiopia represents a significant part of the national economy in general and the rural economy in particular. It contributes

Corresponding Author: Basaznew Bogale, Department of Veterinary Paraclinical Studies, Faculty of Veterinary Medicine, University of Gondar, P.O. Box, 196, Gondar, Ethiopia.

98.5 and 99.2% to the national egg and chicken meat production respectively with an annual output of 72,300 metric tons of meat and 78,000 metric tons of eggs [6].

Indigenous fowl reared under traditional extensive (rural scavenging) system and or improved traditional (semi scavenging) production system constitute one of the important component of rural economy [7]. However, the traditional poultry production system is characterized by low input, low output and periodic destruction of a large portion of the flock due to disease out-breaks. Among the infectious diseases, Newcastle disease, Salmonellosis, Coccidiosis and sometimes Fowl pox are considered to be the most important cause of mortality to the local chickens while predators are an additional source of loss [8].

Traditional/backyard poultry husbandry exposes chickens to many types of parasites. Hence, most of the studies conducted in the different parts of Ethiopia have indicated that the production of chicken affected by both external and gastro I ntestinal parasites is high [9,10]. But no study has been done in this district which has large number of birds. Therefore, the objectives of this study were to determine the prevalence of ectoparasites in poultry managed in the backyard production system and to identify the species of ectoparasites.

MATERIALS AND METHODS

Study Area: The study was conducted in Demba Gofa district of Gamo Gofa zone in South Nations Nationalities and Peoples Region of Ethiopia starting from September, 2011 to March, 2012. According to the information obtained from office of agriculture, the Demba Gofa district situated at a distance of 335km from Hawassa, 250km away from Addis Ababa and 1250km distance from Gondar. Topographically the district with altitude 100-1750meters above sea level. The district boarded on the north Geze Gofa, on the east Kucha, on the south Zala, on the west Oyida. The Demba Gofa district has bimodal rainfall with the mean annual rainfall of 1110mm and the mean annual temperature ranges from 16-30°C. The short raining season starts from February to March where as the long raining season from May to September. [11].

The major livestock reared in this area are cattle, sheep, goat, donkey and poultry. The numbers of animal population in this area were estimated to constitute, 48,120 cattle, 9392 goat, 6382 sheep, 2306 equine, 21,429 poultry [5].

Study Population: The chickens kept under backyard extensive management system owned by individual farmers were considered as a study population. Chickens were selected by including both sexes and different age groups were examined for the presence or absence of ectoparasites.

Study Design: A cross sectional study was conducted so as to determine the prevalence rate of ectoparasites infestation rate in the study area.

Sample Size Determination: The number of poultry required for this study was determined using the formula given by Thrusfield [12] for simple random sampling. The size of sample was determining using 95% level of confidence, 50% expected prevalence since there was no previous work in this study area and 0.05% desired absolute precision. Therefore, a total of 384 chickens were examined.

Clinical Examination: Clinical Examination for ectoparasites and any possible abnormalities were carried out for 384 chickens. During clinical examination, ectoparasites were collected by hand picking and preserved in 70% of alcohol in separated bottles for each host for further identification. Both sex and different age groups could also be considered in this study.

Laboratory Examination: The identification of parasites and other relevant activities were done in the parasitology department of Wolyta Soddo regional veterinary laboratory. After collection, the parasites were examined and identified under the microscope by comparing their morphology with identification keys.

Data Management and Analysis: The result obtained from collection and identification of ectoparasites from poultry was coded and then entered into Microsoft excel spread sheet and was analyzed using STATA version 11.0. The prevalence of ectoparasites in relation to age and sex were analyzed using chi square. In all cases $p<0.005$ was considered as statistically significant.

RESULTS

A total of 384 chickens belonging to different age groups 1and sexes which were managed under backyard system were examined for ectoparasites infestation. Of these 322/384 (83.85%) chickens were infested with one or more s pecies of ectoparasites that were mainly grouped

Table 1: Ectoparasites and their attachment sites in free range chickens

Ectoparasites	Species	Attachment sites	Numbers of infested	Infestation rate (%)
Fleas	*Echidnophaga gallinacean*	Head,Eyes,Comb,	269	83.5
	Total fleas number	Wattles	269/322	83.5
Lice	*Menopon gallinea*	Breast, Thigh,	49	44.95
	Menacanthus stramineus	All over the body	22	20.18
	Lipeurus caponis	Head, Feather	17	15.59
	Goniocotes gigas	Feather	14	12.84
	Goniocotes gallinea	Base of Feather	7	6.422
	Total lice number		109/322	33.85
Tick	*Argus persicus*	Under the Wing base	16	4.97
	Total tick number		16/322	4.97
	Total of Ectoparasites		322/384	83.85

Table 2: Prevalence association of Ectoparasites with age.

Variable		No of examined	No of positive	Prevalence (%)
Age	Brooder	152	143	44.41
	Young	155	135	41.92
	Adult	77	44	13.66
	Total	384	322	83.85

χ^2 (Pearson Chi-square) = 53.52, P-value=0.000 It was found that brooders poultry had significantly high (P<0.05) (Table 2) infestation rate (44.41%) compare to the adult age group (13.66%).

Table 3: Prevalence association of Ectoparasites with sexes

Variable		No of examined	No of positive	Prevalence (%)
Sex	Female	233	209	64.90
	Male	151	113	35.09
	Total	384	322	

χ^2 (Pearson Chi-square) = 14.95, P-value=0.000, Significant There was significance difference in the infestation rate of ectoparasites between two sexes, where, (P<0.05). The infestation rate of ectoparasites in female chickens is significantly higher than the male.

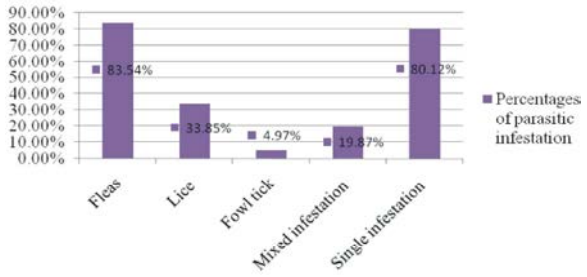

Fig 1: Prevalence distribution of different poultry ectoparasites infestation

into fleas 269/ (83.54%), lice 109/384 (33.85%) and fowl tick 16/ (4.97%). There was also mixed and single infestation accounted for 64/322 (19.87%) and 258/322 (80.12%) respectively (Figure 1).

Seven species of ectoparasites were identified to be common and their respective infestation prevalence and attachment sites are given in Table 1.

Five species of lice (order Mallophagia), one species fleas (order Siphonaptera) and one species of tick (order Acari) were detected from 384 examined chickens in this study. The lice include *Menophon gallinea* 49/109 (44.95%), *Menacanthus stramineus* 22/109 (20.18%), *Lipeurus caponis* 17/109 (15.6%), *Goniocotes gigas* 14/109 (12.8%) and *Goniocotes gallinea* 7/109 (6.4%). The fleas were *Echidnophaga gallinacean* and the tick was *Argas persicus*. Over all prevalence of ectoparasites of infestation was 83.85%. Fleas had the highest frequency of occurrence with an 83.5% prevalence followed by lice with the prevalence of 33.85%. And the lowest was fowl tick with the prevalence of 4.97%. Infestation rate of ectoparasites were compared among different age groups. The result obtained in related to different age category illustrated in Table 2.

DISCUSSION

In the present study, the overall prevalence of ectoparasites (83.85%) was recorded in the chickens managed under backyard system. This finding is higher than the previous study conducted by Al-Saffar and Al-Mawla [13], Nnadi and George [14], Koroglu *et al*. [15] and Bersabeh [16], 19.3%, 41%, 56.5% and 78.0% respectively. This difference in prevalence rate could be due to climatic condition, age of study animals and sample

size. Besides, the village poultry are mostly neglected and reared only a little or no extra feed supplement and improper housing that makes them malnourished. The keeping condition is also very unhygienic, often crowded in a small place with little or no ventilation. All these factors either alone or in combination might have important role in the high prevalence of ectoparasites in backyard poultry.

The *Echidnophaga gallinacean* (stick tight flea) has the highest prevalence when compared to other ectoparasites found in the study. Out of 322 positive chickens, 269 (83.5%) was *Echidnophaga gallinacean*. The prevalence of *Echidnophaga gallinacean* in the present study was high when compared to the other studies carried by Solomon and Elsabet [17] (16.5%) in Wolyta Soddo town in southern Ethiopia, Nnadi and George [14] (35.7%) in south-eastern Nigeria and Gedion [18] (14.6%) in and around Dire Dawa. This might be due to agro-ecological variation of the study area, time of study and management and feeding system of the poultry production. The high prevalence (71.9%) of *Echidnophaga gallinacean* reported by Swai *et al*. [19] in northern Tanzania was more or less comparable to the present study.

In the present study 33.8% prevalence of lice infestation was recorded. This is more or less similar to the previous study carried out in northern Tanzania by Swai *et al*. [19] reported 28.5% of prevalence of lice infestation. In contrast to this, lowest prevalence (12.5%) of lice infestation recorded by Al-Saffar and Al-Mawla [13].The current study is by far lower than different studies conducted in different parts of the world. Saxena *et al*. [20] reported 60.9% lice infestation of fowls in India and Koroglu *et al*. [15] 56.5% infestation with one or more species of lice in Turkey. This may be due to different agro-ecological and management system of the production. Among the lice species, the most common found in this study was, *Menopon gallinea* 49 (44.95%). When comparing the prevalence of *Menopon gallinea* in this study (44.95%) was more or less similar to the previous studies carried by Solomon and Elsabet [17] and Shanta *et al*. [21] 48.94%, 63% respectively.

The lowest prevalence recorded among the Ectoparasites in this study was the fowl tick (*Argas persicus*) which was 16 (4.97%). This was more or less similar when compared with 6.8% recorded by Al-Saffar and Al-Mawla [13] in Mosul, Iraq and also 9.2% recorded by Solomon and Elsabet [17] in Wolyta Soddo town in southern Ethiopia. On contrast to this study, Swai *et al*. [19] and Khan *et al*. [22] were recorded 23.9% and 14.7% prevalence of *Argas persicus* respectively.

In the present study there was a significant difference ($P<0.005$) in prevalence rate of ectoparasites infestation with age. It was found that brooders poultry had high infestation rate than adult age group. This is related to the recent study in southern Ethiopia in Wolyta Soddo town by Solomon and Elsabet [17] and south-east Nigeria by Nnadi and George [14], reported that the young age group were more likely to be infested than adults. Abebe *et al*. [23] reported in his study conducted in extensive management system where chickens have access to outdoor areas and not confined do have a greater diversity of Ectoparasites. On the contrary, the study done by Shanta *et al.* [21] in Bangladesh, who reported that adults were found to be more infested. This variation could be due to climatic condition, agro-ecological zone and study period and management system.

There was significant difference ($P<0.05$) in infestation rate of Ectoparasites between the two sexes. This study was similar to other study done in northern Tanzania by Swai *et al*. [19]. On contrary to the present study, Helina [24] reported that there was no significant difference in the prevalence rate of Ectoparasites infestation between the two sexes. This difference could be due to climatic condition, age, opportunity of exposure of chickens to the Ectoparasites, management system and sample size.

CONCLUSION

Backyard poultry production has been major source of poultry meat and egg production in Ethiopia and yet is still the most neglected in husbandry practice and particular health care. Generally, the study indicated that the external parasites are highly prevalent in poultry in backyard management system which is associated with lack of due attention with respect to hygienic system, treatment and control practices. Among those external parasites, *Echidnophaga gallinacean* was the most prevalent Ectoparasites followed by lice species including: *Menopon gallinea, Menacanthus stramineus, Lipeurus caponis, Goniocotes gigas* and *Goniocotes gallinea* and the soft tick called *Argas persicus*. In the study area there was no any modern animal health care for these backyard kept poultry that might have attributed for higher distribution of Ectoparasites.

Recommendation:

- Awareness should be created to the community on the overall effect of Ectoparasites on productivity of poultry.
- Farmers and extension staff should be trained regarding on improved housing, feeding, disease control and improved productivity of local chicken.
- Further investigation should be carried to identify and estimate external parasites and their effect on the productivity and health of the poultry.
- The government should take responsibility to provide the control measure to the farmers.

REFERENCES

1. Singh, R.A., 2002. Poultry disease. In Poultry production. 3rd ed. Kalyani New Delhi India, pp: 1-319.
2. Tadelle, D. and B. Ogle, 1996. A survey of village poultry production in the central highlands of Ethiopia. Msc. Thesis, Swedish University of Agricultural Sciences.
3. Sonaiya, E.B., 1990. The context and prospects for development of small holder rural poultry production in Africa. CTA- seminar proceedings on the small holder rural poultry production 9-13 October 1990, Thessaloniki, Greece, 1: 35-52.
4. ILCA (International Livestock Centre for Africa), 1993. Annual report. Addis Ababa, Ethiopia. pp: 5-11.
5. CSA (central statistical agency), 2009. Agricultural sample survey. Volume 2 Statistical bulletin 446, Addis Ababa, Ethiopia. pp: 23.
6. Fisseha, M., T. Azage and D. Tadelle, 2010. Indigenous chicken production and marketing system in Ethiopia: Characteristics and Opportunities for market-oriented development. Improving Productivity and Market Success (IPMS) of Ethiopian farmers' project, International Livestock Research Institute (ILRI), Addis Ababa, Ethiopia, 24: 1-3.
7. Mir, A.S., B.A. Pandit, R.A. Shaharar and M.A. Banday, 1993. Prevalence of ectoparasites in indigenous fowls of Kashmir Valley. India Vet. J., 70: 1071-1072.
8. Almargot, A.J., 1987. Avian pathology of industrial poultry farms in Ethiopia: in Proc. 1st National Livestock Improvement Conference, 11-13 February, Addis Ababa. Institute of agricultural Research, Addis Ababa, pp: 114-117.
9. Awoke, K., 1987. Survey of gastrointestinal helminthes of local chickens in and around Bahir Dar. DVM thesis, Faculty of Veterinary Medicine, Addis Ababa University, Debre Zeit, Ethiopia.
10. Eshetu, Y. and T. Tilahun, 2000. Survey of gastrointestinal helminthes of poultry in three Woreda of Arsi zone, Ethiopian. J. Ethiopian Vet. Assoc., 4(1): 30-39.
11. DGWAO, (Demba Gofa Woreda Agricultural Office). (2008). Annual report, Demba Gofa, Ethiopia. pp: 12-13.
12. Thrusfield, M., 2005. Veterinary epidemiology. 3rd ed. Blackwell Science. Ltd. London, UK. pp: 228-246.
13. Al-Saffar, T.M. and E.D. Al-Mawla, 2008. Some hematological changes in chickens infested with Ectoparasites in Mosul. University of Mosul, Iraq. J. Vet. Sc., 22(2): 95-100.
14. Nnadi, P.A. and S.O. George, 2009. A cross sectional survey on parasites of chickens in selected villages in the sub humid zones of south-eastern Nigeria. J. Parasitol., 1: 6.
15. Koroglu, E., C.E. Saki, M. Aktsa, N. Dumanli and M. Argin, 1999. Distribution of lice in chicken in Elazig region. Saglike-Bilimleri-Dergisi-Firat-Universiesi, 13: 57-60.
16. Bersabeh, T., 1999. Survey of Ectoparasites and gastrointestinal helminthes of backyard chickens in three selected agro climatic zones in central Ethiopia. DVM thesis, Faculty of Veterinary Medicine, Addis Ababa University, Debre Zeit, Ethiopia.
17. Solomon, M. and G. Elsabet, 2009. Prevalence of external parasite of poultry in intensive and backyard chicken farm at Wolyta Soddo town. Southern Ethiopia, Vet. World. 3(12): 533- 538.
18. Gedion, Y., 1991. Preliminary survey of Ectoparasites and gastrointestinal tract helminthes of local chickens in and around Dire Dawa. DVM thesis, Faculty of Veterinary Medicine, Addis Ababa University, Debre Zeit, Ethiopia.
19. Swai, E., S.M. Kessy, P. Sanka, S. Banga and J.E. Kaaya, 2009. A survey on Ectoparasites and haemoparasites of free-range indigenous chickens of Northern Tanzania, Tanzania, 22: 9.
20. Saxena, A.K., S. Kumar, N. Gupta and S.K. Sign, 2004. Prevalence of lice (Phthiraptera: Amblycera) on fowls of Uttar Pradesh. J. Parasitic Disease, 28: 57-60.
21. Shanta, I.S., N. Begon, A.S. Anisuzzaman, M. Bari and M.J. Karim, 2006. Prevalence and clinico-pathological effects of Ectoparasites in backyard poultry. Bangl. J. Vet. Med., 4(1): 19-26.

22. Khan, M.N., L.A. Khan, S. Mahmood and A. Qudoos, 2001. Argas persicus infestation, prevalence and economic significance in poultry. Pak. Agri. Sc., 38: 3-4.
23. Abebe, W., T. Asfaw, B. Genet, B. Kassa and P.H. Dorchies, 1997. Comparative studies of external parasites and gastro intestinal helminthes of chickens kept under different management system in and around Addis Ababa. Addis Ababa, Ethiopia. Review on Med. Vet., 148: 497-500.
24. Helina, M., 2000. Epidemiology of gastrointestinal helminthes and Ectoparasites of backyard poultry in three selected agro-ecological zone of central Ethiopia. DVM thesis, Faculty of Veterinary Medicine, Addis Ababa University, Debre Zeit, Ethiopia.